

Association for Information Systems AIS Electronic Library (AISeL)

ACIS 2007 Proceedings

Australasian (ACIS)

2007

Process Orientation to Business Students – Enabling Role of Enterprise Systems in Curriculum

Ravi Seethamraju

The University of Sydney, Ravi.Seethamraju@sydney.edu.au

Follow this and additional works at: <http://aisel.aisnet.org/acis2007>

Recommended Citation

Seethamraju, Ravi, "Process Orientation to Business Students – Enabling Role of Enterprise Systems in Curriculum" (2007). *ACIS 2007 Proceedings*. 106.

<http://aisel.aisnet.org/acis2007/106>

This material is brought to you by the Australasian (ACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ACIS 2007 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Process Orientation to Business Students – Enabling Role of Enterprise Systems in Curriculum

Ravi Seethamraju
Business Process Management Research group
Faculty of Economics & Business
The University of Sydney
Sydney, Australia
Email: r.seethamraju@econ.usyd.edu.au

Abstract

Developing process orientation skills is now essential for the effective workplace performance of business graduates. This paper reports on one ongoing curriculum development project that extended the deployment of SAP, an enterprise system software solution, into two discipline-based courses offered by different disciplines – human resources and accounting – within a broad undergraduate business curriculum, and analyses the pedagogical effectiveness of the project. Employing a questionnaire survey and self-assessment of the knowledge and skills gained, this paper reports on the effectiveness of the curriculum design and delivery. This study demonstrates the powerful role played by the enterprise system software in developing conceptual understanding of process focus and integration, and the effect of enterprise systems on work environment to business student. Even though it is difficult to impart process orientation to students just with the help of ES software solution, this study asserts that it is possible to create and improve understanding of the concepts of process and integration, and the effect of ES on work environment with the deployment of ES software into business curriculum..

Keywords

Process orientation, enterprise systems, business curriculum.

Introduction

With the increasing recognition of business processes as critical corporate assets, developing ‘process orientation’ and ‘process view’ of an organization among its employees has become imperative for modern business organizations. Many of the world’s best business organizations such as CISCO, Texas, Dell and Amazon have embraced ‘process-centred thinking’ or ‘process view’ and changed their organizational structures, strategies, and models and trained their employees. The sophistication of this integrated dynamic world of work requires the ability to critically evaluate situations from cross-functional perspectives with a focus on process and customers, rather than on hierarchy and functions. Reflecting these dynamic changes in business organizations and the increasing emphasis on process-centred thinking, business schools are also continuing to modify their curricula with a view to imparting these important skills to business students. Business graduates must be able to apply the knowledge of concepts, principles and methods learnt during their university education to the work environment and not be restricted by the discipline-centric narrow view of the business. Process orientation and associated integrative skills not only help graduates to function effectively in a modern work environment later on, but also encourage deep learning from a pedagogical perspective in the classroom.

This paper reports on the extension of the deployment of SAP, an enterprise resource planning (ERP) or enterprise system (ES) software solution, into various subjects taught by two different disciplines with a view to develop business process orientation among business students. It will first provide a brief review of the literature on the deployment of ES software solutions in business curricula and then analyse the pedagogical benefits and effectiveness of such deployment.

Literature Review

Inadequacies of Business Education

The pedagogical model of business education was developed at the beginning of the 20th century and was based on a functional structure that typically included marketing, logistics, accounting, human resources, etc. These functionally specialized schools/disciplines were designed to meet the needs of large, highly bureaucratized organizations. Most of the business schools still employ this model. With its strength in developing specialist technical professional in accounting, human resources or finance, business schools are criticized for their inability to produce well-rounded business graduates and, in particular, business process orientation and cross-

functional integrative skills. This perception is reflected in the importance given by AACSB in their evaluations and accreditation of business schools to the level cross-functional integration and process orientation.

Business education has been subjected to several rounds of reviews all over the world in the past 20 years. Many such reviews have highlighted the importance and lack of cross-functional integration and business process orientation in the business curricula (Porter and McKibbin 1988, Karpin 1995, Michaelson 1999, Cecez-Kecmanovic et al 2002, BCG 2001, Ehie 2002 and Trites 2004). Many employer representatives and professional associations such as Business Council of Australia, Australian Chamber of Commerce, Australian Computer Society, Australian Management Institute etc, have advocated incorporating 'employability' skills including business process orientation and generic graduate attributes such as communication, leadership, and group work into the curricula thereby bridging the gap between education and work (Curtis and McKenzie 2001). The Federal government and other government bodies are also encouraging the development of a higher education strategy to embed such employability skills in universities.

In the past, business schools approached this problem by using several pedagogical strategies such as the capstone subject project, integrated case studies, team teaching, and simulation games. The capstone project, for example, requires students to play roles from different functional areas and work as a team to develop and implement a business plan. Another strategy is to use a cross-functional team to interact with a business simulation game that reproduces the dynamic nature of the business environment and provides simulated responses to the students' decisions in the game. The effectiveness of these strategies, however, was not empirically measured and not known widely. While these approaches are found to be useful in developing team working skills and a general understanding of how businesses operate (AACSB 2003), they do not provide much insight into how information systems and technologies can be used to support the core business processes.

Several 20th century management initiatives, including Just-in-time (JIT), Total Quality Management (TQM) and Business Process Reengineering (BPR), have process and process management as their underlying theme. As a result of implementing such initiatives, many business organizations have shifted their focus towards business processes that are cross-functional and customer focused, and shifted the management development emphasis away from functional specialization and towards the integration of different functional departments with process focus (Malekzadeh 1998). Even though business organizations increasingly seek graduates with the ability to analyse the problems from cross-disciplinary knowledge and customer focus, university business schools, however, have not adopted the same approach (Lightfoot 1999). This has resulted in a significant gap between business needs and curriculum offerings by university business schools. A summary of the inadequacies of the current business education system is presented in Table 1, below.

Table 1: Summary of inadequacies in current business education

Factors	Summary of inadequacies in current business education
Discipline-based structure of university business schools	<ul style="list-style-type: none"> Functionally oriented Develop good specialists in individual disciplines Difficulty in changing functionally oriented teaching focus entrenched for many decades into process orientation and integration Lack of interest among academics and support from management to incorporate technology solutions aligning curriculum with business needs
Employers' concerns	<ul style="list-style-type: none"> Graduates are narrowly trained and hold a 'functional silo' view of the way business is conducted Lack cross-functional process perspective and integrated view of business No alignment of business curriculum with changing business needs
Inadequate teaching & learning strategies	<ul style="list-style-type: none"> Course on strategy, simulation game, capstone unit/project, case study or team-teaching approach – typically adopted to impart cross-functional process perspective Curriculum structure, course syllabus and teaching and learning strategies inconsistent with the modern idea of integrated processes Integration left to individual student and/or individual faculty members
Usage of information technologies/ systems	<ul style="list-style-type: none"> Insufficient information and process orientation in discipline-based core units despite growing importance in business Undue focus on imparting IT skills and/or usage of information systems and technologies as teaching aids for improving teaching and learning effectiveness Underlying importance and utility of information and process links in developing integrated view between various business functions generally ignored

Process Orientation

The rapid change, global competition and diffusion of technology have intensified the need for organizations to stimulate, facilitate and maintain cooperation between various functional areas. Several past researchers and experts have suggested companies focus and improve the entire chain of their business operations placing less

emphasis on hierarchical and functional structures. Davenport and Short (1990) explicitly articulated the concept of 'process orientation' and recommended it as a beneficial management practice. This process orientation is considered an essential ingredient for successful reengineering and redesign efforts (Hammer & Champy 1993, Davenport 1993). Organizations that have adopted this concept are termed 'the horizontal organization' (Bryne 1993), 'the process-oriented organization' (Hammer 1996), 'the process enterprise' (Hammer & Stanton 1999) or 'process focused organizations' (Gardner 2004). This notion of 'process orientation' refers basically to the awareness of the interdependencies and information sharing between various functional units and business models, with an underlying focus on the customer and customer needs. The process is a "lateral or horizontal organisational form that encapsulates the interdependence of tasks, roles, people, departments and functions required providing a customer with a product or service" (Earl 1994, pp.13).

Even though the concept of 'process orientation' is almost a decade old, most of the literature on process orientation has been in the popular press and lacks empirical focus (Susan & Johnson 2003). The positive effect of process orientation on improved business performance in terms of customer satisfaction, market value and accounting returns, however, has been empirically supported (Frei et al 1999, Anderson & Fornell 1994, Ittner & Larcker 1997). Process orientation helps organizations reduce inter-functional conflict and improves business performance (McCormack & Johnson 2001). A study by Gustafsson & Nilsson (2003) showed a direct impact of process orientation on customer satisfaction. Process orientation makes the processes within an organization more transparent and creates an environment conducive to continuous process improvement efforts (Reijers 2006). Business process orientation thus emphasizes the 'processes as opposed to hierarchies, with a special focus on outcomes and customer satisfaction. Business process orientation violates in its logic, the classic management principle, functional specialization, but may help understand better the perspectives taken by other functions, develop a collective sense of belonging and facilitate the reduction of cross-functional conflicts (Huang and Newell 2003).

It is, however, important to note that achieving business process orientation is an ongoing process. Achieving expert status requires a high degree of self-awareness, critical thinking and deep learning (Quinn et al 2003). Apart from helping business graduates to function effectively in a work environment later on, pedagogically this process orientation is expected to encourage students' deep learning and better understanding of intersections and interactions of traditional disciplines such as marketing, operations, accounting and human resources (Burrack & McKenzie 2005).

The Role of Enterprise Systems

With its focus on business processes and information sharing/transfer, the discipline of business information systems in general, and the enterprise systems (ES) software solutions in particular, provide the most common link between traditional functions such as marketing, operations, accounting and human resources (Duplaga & Astani 2003, Leidner & Jarvenpaa 1995, Hershey et al 2002). Enterprise systems are commercial software packages that provide cross-functional integration through embedded business processes and are generally composed of several modules including procurement, sales and distribution, human resource, accounting, controlling, production, warehouse management, customer service and plant maintenance. This technology promises to replace discrete, home-grown, stand-alone information systems with an integrated, enterprise-wide infrastructure that will streamline organizational activities and eliminate duplication of effort and data (Markus & Tanis 2000).

Developed and sold by specialized software vendors such as SAP and Oracle with 'generic industry best practices', these enterprise systems are shared information systems that can serve different departments' particular needs (Davenport 1998). Enterprise systems implementation involves customizing and/or configuring software packages and changing their existing suboptimal non-standard business processes and organizational arrangements, therefore effecting a much wider organizational change. Thus, enterprise systems have now become 'de facto' standard for replacing legacy information systems and offering a robust platform for integrating business processes and information in a majority of business organizations in Australia and around the world. By allowing efficient and effective communication across functions, enterprise systems enable managers to better understand the business processes that run through the different functions of an organization and facilitate integration (Amrani et al 2006).

In spite of such persistent demand for graduates with integrative skills and business process orientation, and the powerful capabilities of ES software solutions in imparting these skills, their adoption into the business school curriculum in Australia has been relatively slow. The uncertainty of the pedagogical benefits and non-traditional assessment methods, complexity and challenges involved in designing appropriate assessment tasks and mechanisms, administrative and academic challenges of incorporating ES software and the requirement of continuous updating of such complex best practice industry software solutions into business curricula have affected the ability and motivation of many business schools to incorporate these solutions (Seethamraju 2007, Hawking et al 2004). Evidence from recent attempts at integrating ES software solutions such as SAP R/3 and

PeopleSoft appear to be positive (Seethamraju 2004, Hawking et al 2004). These initiatives are contributing to the development of process orientation and deep learning among university business students, and are helping to move the business curriculum closer to the 'real world' environment (Cannon et al 2004, Seethamraju 2004, Hawking et al 2004, Fedorowicz et al 2004).

In this environment, SAP R/3, one of the most popular industry standard ERP software solutions was incorporated as a pilot subject in 2004 into one undergraduate unit in the business school at the University of Sydney. Titled 'enterprise systems', this subject primarily focused on providing a business process perspective to students with the help of an ES software solution. Based on anecdotal feedback from students and graduates, the course so far has proved to be the most useful in the workplace and appears to have significantly enhanced students' cross-functional perspectives and employability (Seethamraju 2007). Considering the successful pilot, extended usage of ES software is proposed in other disciplines such as Accounting, Work and Organizational Studies, Marketing and Logistics. Embedding process orientation, the key employability skill, more deeply into the curricula will assist the business school in strengthening the links between education and the labour market (Curtis & McKenzie 2001). In addition to this, using a standard, industry best practice software as a common tool in all the discipline-focused subjects is expected to powerfully demonstrate the need for an integrated view. With the objective of developing business process centred thinking among business students, the usage of an ES software tool is extended to other disciplines, as explained below.

Research Framework & Methodology

The objective was to develop an understanding of business processes, information and business rules relevant to that functional discipline (for example, accounts payable, general ledger, accounts receivable and financial accounting), and the interdependencies on other functions. In addition to demonstrating the integration needs, the aim was to develop a process view of an organization and to impart process thinking. This was done in one unit each from the accounting and human resources disciplines. Accordingly, two laboratory sessions were incorporated into each of these units. Lab sessions for both the human resource and accounting students were conducted in weeks 10 and 11 of the semester. Each session was of 3 hours duration. Lecturer first explained the information flows and activities/tasks relevant to their particular function (for example human resources of accounting), their interacting effect on other functions/disciplines and the integrative capability and consequent benefits of the enterprise system. The lecturer then introduced them to SAP, an enterprise system demonstrating its basic features, master data and transaction cycles. Students were then given hands-on exercises to practice the processes, master data creation and transaction cycles in the system. More than 50% of the time is allocated for hands-on practice on SAP under the supervision of the academic staff.

The focus of these two lab sessions was to demonstrate the generic cross-functional orientation and integrative capability of the SAP R/3 software, process cycles relevant to a particular function (say, human resources or accounting) and master data (customer master, material master, vendor master, employee master, general ledger account). These SAP sessions were taught in a computer laboratory environment where access to the system is readily available for demonstration and for hands-on practice. At the end of the sessions, a small assessment task worth 10% was given to the students. This task involved the creation of master data relevant to their functions/processes and the execution of process transaction cycles relevant to their particular module.

A questionnaire containing a series of statements was employed as the primary method of data collection. This questionnaire has two parts. The first part consists of 15 statements that measure students' understanding and knowledge of the issues before and after the SAP lab sessions. These statements measure the concept of process orientation. Students were asked to 'self-assess' their understanding and knowledge using a Likert scale of 1 (very low) to 7 (very high). These statements measured students' perceived knowledge on aspects such as concepts of integration, purpose of enterprise systems in business, inter-dependencies between a particular function relevant to their discipline (say human resources or accounting), information flows across various activities and tasks, ability of enterprise systems to reduce inter-functional conflicts and increase customer focus and overall process knowledge. In addition, respondents were also asked to rate their view of the potential impact of the ES-enabled work environment on employees' (ES users) broader perspective, cross-functional process understanding and effects individual actions may have on the work of others. For each statement, respondents were asked to assess their understanding before the lab session and after the lab sessions. The difference between these two ratings is considered the perceived gain in knowledge by the respondents as a result of these SAP lab sessions. This was administered in week 12, one week after the lab sessions were completed.

The second part of the questionnaire sought students' perceptions on the SAP lab sessions in terms of their pedagogical effectiveness. It consisted of 5 statements that will measure students response using a 'Likert' scale from 1 (very low) to 5 (very high) on specific issues. These statements sought students' perception on issues such as hands-on experience with SAP software and laboratory learning of the SAP application modules, their willingness to learn more, and their ability to self-learn the software tools. In addition to this, some demographic

information such as the degree course the students in enrolled in, student status (local or international) and previous experience were also collected.

Analysis and Findings

All the students enrolled were respondents in this study. Of the 112 students enrolled in this study, 54 students were enrolled in human resources and 58 students in accounting. From this sample, only 104 responses were found to be valid (51 from Human resources and 53 from Accounting) were found to be valid. Of these, 58% are presently employed, 53% are local students, and 59% have no previous employment experience.

In order to see whether there is any significant gain in the understanding and knowledge of the students as they are put through these two SAP lab sessions, a paired t-test analysis was carried out for both cohorts of students and results are presented below. Results clearly show that there is evidence of a significant gain in the knowledge at 0.05 level for a majority of the attributes.

Table 2: Respondents' understanding and knowledge – paired t-test results (before and after)

	Factors – Understanding and knowledge of	HR Course		Accounting Course	
		Gain	Significance	Gain	Significance
1	Concepts and importance of process integration	2.75	0.05*	4.09	0.00*
2	Concept and importance of information integration	2.35	0.32	3.81	0.00*
3	What enterprise systems are about	3.21	0.00*	3.93	0.00*
4	Processes and activities relating to their function	2.96	0.21	3.78	0.00*
5	Information flows across various activities and processes relating to their function	2.11	0.35	3.66	0.00*
6	Inter-dependencies between their function and other functions	2.42	0.05*	3.22	0.00*
7	Ability of enterprise system to reduce inter-functional conflicts	2.11	0.43	3.00	0.11
8	Ability of enterprise system to improve interdepartmental connectedness	1.51	0.67	1.73	0.55
9	Ability of enterprise system to enable customer focus	1.84	0.21	2.01	0.11
10	Ability of enterprise system to support the execution and control of tasks and processes	3.57	0.00*	3.71	0.00*
11	Ability of enterprise system to develop broader view of their function	3.34	0.00*	3.33	0.00*
12	Ability of enterprise system to develop broader perspective of organization	3.26	0.02*	3.08	0.04*
13	Ability of enterprise system to enhance process knowledge among employees	1.40	0.54	1.12	0.15
14	Ability of enterprise system to provide a single system of reference for the entire organisation	3.01	0.04*	3.44	0.00*
15	Effect individual actions may have on the work of others working in other functional areas	2.89	0.05*	3.07	0.01*

The above table shows that the average level of gain in understanding and knowledge is significant on many dimensions for both the Human resources and Accounting students, especially on dimensions such as concepts of information and process integration, inter-dependencies between different functions, ability of enterprise system to support execution and control of tasks and develop broader understanding of the function and organization. The study clearly demonstrates the integrative capability of the enterprise system software solution and its pedagogical value in imparting concepts that deal with integration and inter-dependencies. Even though, students are exposed to SAP, an enterprise system just for two lab sessions, its hands-on experience and its powerful capability convey the concepts of integration and interconnectedness of various functions, clearly found to be effective. Therefore, in way, the findings suggest that the objective of incorporating an ES software solution into the curriculum courses offered by disciplines is thus achieved.

On some of the dimensions that measure business process orientation, there is no significant improvement in the knowledge gained by both cohorts of students. For example, some of the major attributes of process orientation that include the ability to reduce inter-functional conflicts, improve interdepartmental connectedness, and to enable customer focus and process knowledge. Business process orientation, as the study points out, though is important, is not easy to impart just with the help of enterprise system software. Incorporating ES software in a limited way into the other disciplines' subjects may not directly contribute to any significant understanding of

business process orientation. Especially, customer focus of employees and organisation, improvement in the inter-connectedness of the functions/departments and reduction of inter-functional conflicts is something that is understood with experience. Since a large proportion of students have no experience, it is possible that this aspect is not recognised and understood by the students. SAP lab sessions also predominantly focused on the integration of information, processes and information flows relating to their particular function. In view of the limited number of sessions (just two lab sessions), it is not possible to incorporate all the attributes of process orientation.

Even though the focus of the SAP sessions was on the integration of information and processes and information flows relating to human resources function, HR students did not seem to have achieved a significant gain on these attributes that deal with integration. In general, human resource is viewed as a service discipline and integration of that function and its information with other functions such as logistics, accounting probably is not viewed important by the HR students. In view of the limited functionality of the HR module in SAP and its inability to demonstrate the powerful influence of Human resource costs etc. on accounting and other functions, the students probably did not appreciate the issues involved in integration.

Respondents also rated the SAP lab sessions and have given their perceptions. Table 3, below, gives a summary of respondents' views on SAP lab sessions and the perceived gain in software skills and knowledge.

Table 3: Respondents' perception of SAP lab sessions

No.	Factors – Different aspects of the SAP Lab sessions	Human resources students	Accounting students
1	Hands-on experience with SAP software (1= very poor, 5= very good)	3.46	3.96
2	Learning of SAP software skills in laboratory (1=very easy, 5= very difficult)	3.69	4.23
3	Confidence in improving SAP software skills (1= very low, 5 = very high)	3.21	3.87
4	Performance in the assessment task (1=very poor, 5= Very good)	3.19	4.12

As shown in Table 3, respondents generally appear to have gained a good level of knowledge and software skills. Given the limited laboratory sessions and the limitations on what can be covered in two sessions, the respondents felt confident that they could improve their software skills with sufficient training. Similarly, the respondents also expressed confidence that they had developed some understanding of the ES-enabled work environment. Importantly, the performance of the students in the assessment task is observed to be good for both the cohorts of students, and especially more for accounting students. For accounting students, these sessions proved to be more effective and useful because of the important role Accounting play and the integrative influence of accounting transactions that touch all aspects of the business. Given the centrality of Accounting discipline in business organisations today and the emphasis of transaction cycles starting from account payables, procurement, sales and account receivables functionality in the SAP lab sessions, opportunity to demonstrate several accounting concepts is much higher than the human resource concepts. This is clearly shown in the performance of the students in this specific assessment task. This assessment task involved a series of exercises that involved the creation of organizational structure, positions, jobs and recruitment of persons and assignment, and maintenance of employee master data for HR students. For accounting students, it involved creation of general ledger account, account payable, procurement of trading goods, and account receivable transactions.

Teaching and assessing SAP R/3 software skills, in particular differentiating between the system errors and students' mistakes in creating master data and performing various transactions, is a challenge. It is also difficult to ascertain whether this assessment task measured students' knowledge of the processes and information flows relevant to human capital management or whether they routinely performed the transactions or not. The level of knowledge the respondents appeared to have gained on processes and information flows relevant to human capital management, however, is high (3.51 and 3.59). Self-assessment of the knowledge and performance of respondents in the academic assessment task appears to be consistent with each other. Therefore, it is safe to conclude that the students have acquired adequate software skills and knowledge of processes relevant to human capital management.

Even though the number of sessions was limited, the level of knowledge gained in SAP software skills appears to be good. In general, software-based courses are hands-on in nature, and present opportunities for students to participate actively in learning by doing things in the class. Because of these features, they stimulate learning stronger than other traditional teaching strategies. In addition, they expose students to real-world business contexts, business processes and transactions, and potentially equip students with employable skills. All these features will stimulate students' interest further and enhance their learning effectiveness. Confirming this

observation, a large majority of students reported satisfaction with this part of the course and reported improvement in their integrated view of the business enterprise.

In general, it appears that the respondents have developed a good understanding of the impact of ES-enabled work environments (all of them more than 3.00). Even though this is not the main focus of the course, the respondents have identified the positive impact of ES-enabled work environments in terms of developing a broader perspective of the processes and the organization, cross-functional processes, and inter-dependency aspects.

Differences

Previous experience is considered a critical variable that might differentiate between understanding and knowledge gained and the perceptions of the respondents. In order to see whether there are any significant differences between these two groups of respondents, two tailed t-tests for two independent samples at 5% significant levels were considered appropriate and employed. Because of their robustness, versatility and general acceptance in the literature, parametric tests such as t-tests are increasingly used with ordinal data [24]. Table 5 gives details of the t-test results analysing the differences between respondents who have previous experience and those who do not have any previous experience.

Table 4: Differences between respondents – t-test results

No.	Constructs (HR: Employed (21) and Not employed (30) Accounting – Employed (17) & not employed (36)	HR students		Accounting	
		Mean difference	Significance	Mean difference	Significance
1	Process Integration Concepts (1, 2, 3, 4 & 5 items)	-1.44	0.11	-2.21	0.02*
2	Impact of ES on work (items 10, 14 & 15)	-1.04	0.25	-2.37	0.00*
3	Integrative capability of ES (items 6,7,8 & 9)	2.16	0.02*	2.36	0.01*
4	Broader perspective (items 11, 12 & 13)	0.81	0.78	1.01	0.15

Respondents from both the cohorts, with no previous experience reported a higher understanding of the theoretical concepts that deal with integration, process, information flows, effect of enterprise systems on work and related concepts. The difference, however, is significant only in case of accounting students. In case of HR students, though it is higher for students who are not previously employed (no experience); the difference is not significant at 0.05 level. It is possible that students with no experience perceived a higher level of knowledge gain because of their limited exposure to the concepts. On the other hand, respondents with some previous experience probably had some basic knowledge of these concepts in practice and therefore did not report as much gain in knowledge. Moreover, the novelty of the SAP lab sessions and the steep learning about the potential and effects of integration through practical hands-on experience and demonstration, also must have contributed to this. On other aspects such as broader process perspective, general perception of the lab sessions, SAP software skills and actual academic performance task (SAP skills), no significant differences were observed (not shown in the above table).

This study was designed and administered by the author with the help of research assistants and tutors. The findings, therefore, may have some inherent bias. In addition, general limitations of a typical questionnaire survey and self-assessment of students' knowledge would apply to this study. The possibility of over or under assessment of the perceived knowledge, ambiguity of the statements designed and the variation of perceptions due to previous knowledge and experience are some of the weaknesses in the study. In spite of such limitations, this study will make a positive contribution to the literature on the effectiveness of incorporating enterprise systems into the business curriculum.

Conclusions

This is a limited attempt at extending the deployment of SAP R/3 into the business curriculum and particularly to the human resources management-related course and Accounting course in a particular university. The specific objectives of this deployment were achieved and the respondents were generally satisfied with the outcomes. Some of the key areas of understanding that were typically neglected in the past are business processes and the inter-dependencies of various business functions. While it is possible to explain the concept of process orientation with the powerful integrative capability of enterprise system, other attributes of process orientation such as customer focus, inter-connectedness and reduction of functional/discipline conflicts etc. are

difficult to comprehend in this curriculum. This study demonstrates the powerful role played by the ERP system in developing business process orientation and cross-functional perspective to business students. While the existing course including this attempt generally focused on the integration concepts, and SAP transactional cycles in specific module and the associated information flows and processes, emphasis on the use and management of enterprise systems is necessary in future courses.

References

- AACSB International 2003, *Eligibility Procedures and Standards for Business Accreditation*. St. Louis: AACSB.
- Amrani, R., Rowe, F. & Geffroy-Maronnat, B. 2006, The effects of enterprise resource planning implementation strategy on cross-functionality. *Information Systems Journal*, 16, 79-104.
- Andreson, E.W. & Fornell C. 1994, Customer satisfaction, market share, and profitability: findings from Sweden. *Journal of Marketing*, 58(3), 53-66.
- Boston Consulting Group (BCG) 2001, *Report of Business Council of Australia e-Business Roundtable*, Melbourne: Business Council of Australia.
- Bryne, J.A. 1993, The horizontal corporation. *Business Week*, 13 December, 76-81.
- Burrack F. & McKenzie, T 2005, Enhanced student learning through cross-disciplinary projects. *Music EducatorsJournal*, 91(5), 45-50.
- Byrne, J. 1993, Harvard b-school: an American institution in need of reform. *Business Week*, 58-65.
- Cannon, D.M.K., Koste, L.L., & Magal, S.R. 2004, Curriculum integration using enterprise resource planning: an integrative case approach. *Journal of Education for Business*, 80(2), 9-15.
- Cecez-Kecmanovic, D. et al 2002, *Australian Business Education Study: Enhancing the Quality of Australian Business Education*. URL http://www.autc.gov.au/projects/completed/aust_business_educ/split_prdf.htm accessed 20th Oct 2004.
- Curtis, D., & McKenzie, P. 2001, *Employability Skills for Australian Industry: Report to Business Council of Australia and Australian Chamber of Commerce and Industry*, Camberwell, Vic: Australian Council for Educational Research.
- Davenport, T. 1993, *Process Innovation: Reengineering Work through Information Technology*. Boston, MA: Harvard Business School Press.
- Davenport, T. & Short, J. 1990, The new industrial engineering: information technology and business process redesign. *Sloan Management Review*, 31(4), 11-27.
- Davenport, T. 1998, Putting the enterprise in the enterprise system. *Harvard Business Review*, Sept-Oct, 65-77.
- Duplaga, E.A. & Astani, M. 2003, Implementing ERP in manufacturing. *Information Systems Management*, Summer: 68-75.
- Earl, M.J. 1994, The new and old business process redesign. *Journal of Strategic Information Systems*, 3, 5-22.
- Ethie, I.C. 2003, Developing a management information systems (MIS) curriculum: perspectives from MIS practitioners. *Journal of Education for Business*, 77(3), 151-159.
- Fedorowicz, J., Gelinis, U.J., Usoff, C. & Hachey, G. 2004, Twelve tips for successfully integrating enterprise systems across the curriculum. *Journal of Information Systems Education*, 15(3), 235-299.
- Frei, F.X., Kalakota, R., Leone, A.J. & Marx, L.M. 1999, Process variation as a determinant of bank performance: evidence from the retail banking study. *Management Science*, 45(9), 1210-1220.
- Gardner, R. 2004, *The Process-focused Organization: A Transition Strategy for Success*. Milwaukee, WI: ASQ Quality Press.
- Gustafsson, A. & Nilsson, L. 2003, The role of quality practices in service organizations. *International Journal of Service Industry Management*, 14(2), 232-244.
- Hair, J.E. Jr., Anderson, R.E., Tatham, R.L. & Black, W.C. 1998, *Multivariate Data Analysis*. Fifth edition, Upper Saddle River, NJ: Prentice Hall International.
- Hammer, M. & Champy, J. 1993, *Reengineering the Corporation: A Manifesto for Business Revolution*, New York, NY: HarperCollins.

- Hammer, M. & Stanton, S. 1999, How process enterprises really work. *Harvard Business Review*, November/December, 108-118.
- Hawking, P., McCarthy, B. & Stein, A. 2004, Second wave ERP education. *Journal of Information Systems Education*, 15(3), 327-332.
- Hershey, G.L. et al 2002, A different focus and content for the core information systems course for business school majors. *Communications of the Association for Information Systems*, 12, 479-493.
- Huang, J.C. & Newell, S. 2003, Knowledge integration process and dynamics within the context of cross-functional projects. *International Journal of Project Management*, 21, 167-176.
- Ittner, C.D. & Larcker, D.F. 1997, The performance effects of process management techniques. *Management Science*, 43(4), 522-533.
- Karpin, D.S. 1995, *Enterprising Nation: Renewing Australia's Managers to Meet the Challenges of the Asia-Pacific Century*, Report of the Industry Task Force on Leadership and Management Skills. Canberra: Australian Government Publishing Service.
- Leidner, D.E. and Jarvenpaa, SL 1995, The use of information technology to enhance management school education: a theoretical view. *MIS Quarterly*, September, 265-291.
- Lightfoot, B. 1999, *The Development of Language: Acquisition, Change and Evolution*, London, UK: Blackwell Publishing.
- Malekzadeh, A.R. 1998, Diversity, integration, globalization and critical thinking in the upper division. *Journal of Management Education*, 22(5), 590-603.
- Markus, L. & Tanis, C. 2000, The enterprise systems experience: from adoption to success. In *Framing the Domains of I.T. Management*, Zmud R. (ed), 173-208, Cincinnati, Oh, USA: Pinnaflex.
- McCormack, K. & Johnson, W. 2001, *Business process orientation: Gaining the e-Business Competitive Advantage*, Boca Raton: St Lucie Press.
- Michaelsen, L.K. 1999, Integrating the core business curriculum: an experience-based solution, 15(2), 9-10.
- Morris, J.S. 1997, A new approach to teaching production/operations management in the business core curriculum. *Production & Inventory Management Journal*, 38(2), 42-46.
- Porter, L.W. & McKibbin, L.E. 1988, *Management Education and Development: Drift or Thrust into the 21st Century?* New York: McGraw Hill.
- Quinn, R., Faerman, S. & Thompson, M. 2003, *Becoming a Master Manager: A Competency Framework*, 3rd edition, New York: John Wiley.
- Reijers, H.A. 2006, Implementing BPM systems: the role of process orientation. *Business Process Management Journal*, 12(4), 389-409.
- Seethamraju, R. 2004, Effectiveness of a postgraduate program in ERP incorporating SAP R/3. *International Journal of Informatics Education Research*, 6(1), 29-42.
- Seethamraju, R. 2007, Enterprise systems (ES) software in business school curriculum – evaluation of design and delivery. *Journal of Information Systems Education*, 18(1) (forthcoming publication).
- Trites, G. 2004, Decline of the age of Pacioli: the impact of e-business on accounting and accounting education. *Canadian Accounting Perspectives*, 3(2), 171-186.
- Wheeler, B.C. 1998, The state of business education: preparation for the past? *Selections*, 14(2), 19-21.

Copyright

Ravi Seethamraju © 2007. The authors assign to ACIS and educational and non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to ACIS to publish this document in full in the Conference Proceedings. Those documents may be published on the World Wide Web, CD-ROM, in printed form, and on mirror sites on the World Wide Web. Any other usage is prohibited without the express permission of the authors.